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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/500,165

06/23/2004

Mariko Miyachi

NEC DP-907

9053

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EXAMINER

BEST, ZACHARY P

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/500,165	<b>Applicant(s)</b> MIYACHI ET AL.	
	<b>Examiner</b> Zachary Best	<b>Art Unit</b> 4191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 2/8/2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/23/2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**LITHIUM-ION SECONDARY BATTERY**

Examiner: Z. Best    S.N. 10/500,165    Art Unit: 4191    February 25, 2007

**Detailed Action**

1. Examiner withdraws the Non-Final Office Action dated January 9, 2008 based on the arguments in the Request for Clarification and Replacement Action filed on February 8, 2008 by Applicant.

***Drawings***

2. The drawings are objected to because in Figures 3 and 6 the word “battery” is misspelled as “vattery” and in Figure 5 the word “negative” is misspelled as “negaitive.” Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as

either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102 / 103***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4-9, 11, and 12 are rejected under 35 U.S.C. 102(a) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fujimoto et al. (JP 2001-283833 A).

Regarding Claims 1 and 9, Fujimoto et al. teach a Li ion secondary battery comprising a positive electrode capable of absorbing and desorbing Li ions (section 0015) and a negative electrode comprising a first layer that is largely composed of C (claim 1) and a second layer

that contains an element to be alloyed with Li (claim 1). Fujimoto et al. teach that when the Li ion secondary battery has 4.2 V after charge voltage, and 2.75 V after discharge voltage, good capacity retention is maintained (sections 0030-0032). The method for using the Li ion secondary battery is also taught (section 0030).

It is the Examiner's position that the other properties of the Li ion secondary battery of Fujimoto et al., such as the Li content of the second layer upon full discharge, are inherent, given that the Li ion secondary battery of Fujimoto Et al. and the present application have similar materials, material configurations, and process steps for use. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

Alternatively, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the Li content of the second layer upon full discharge by changing the after charge voltage in order to increase capacity retention (see Fujimoto et al., section 0030).

A "whereby" clause in a method claim is not given patentable weight when it simply expresses the intended result of a process step positively recited. *Minton v. Nat 'l Ass 'n of Securities Dealers, Inc.*, 336 F.3d 1373, 1381, 67 USPQ2d 1614, 1620 (Fed. Cir. 2003). The "wherein" clause recited by Applicant is merely the intended result of the method claim, therefore it is not given patentable weight to Claim 9.

Regarding Claims 4 and 11, Fujimoto et al. teach that the element in the second layer may be one of Si, Ge, Sn Al, or In (see par. 10).

Regarding Claims 5 and 12, Fujimoto et al. teach that the element to be alloyed with lithium, Si and/or Sn is/are included (see par. 10).

Regarding Claim 6, Fujimoto et al. teach that the first layer includes, among other things, graphite and diamond like carbon (see par. 13).

Regarding Claim 7, Fujimoto et al. teach that the active material of the positive electrode includes lithium cobalt oxide, lithium manganese oxide, or lithium nickel oxide (see par. 16).

Regarding Claim 8, Fujimoto et al. teach that the active material of the positive electrode includes lithium manganate (see par. 16).

6. Claims 1, 4-9, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (JP 2001-283833 A) in view of Barker et al. (U.S. Patent No. 6,392,385 B1).

Regarding Claims 1 and 9, Fujimoto et al. teach a Li ion secondary battery as recited in Paragraph 5 above. However Fujimoto et al. do not specifically teach a lithium content of the second layer between 31-67 at.% at a discharge depth of 100%.

Barker et al. teach a method for using Li ion batteries to extend cycle life of the battery. In one embodiment, Barker et al. teach an after charge voltage of 4.2 V with an after discharge voltage of 3.6 V (see col. 3, lines 1-6). Furthermore, Barker et al. teach the

importance of discharge time limit in regards to capacity retention (col. 2, lines 53-58). Use of a known technique to improve similar devices in the same way is rationale for one having skill in the art to create the resultant device. *See KSR Int'l Co. v. Teleflex*, 127 S.Ct 1727 (2007). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make a Li ion secondary battery of Fujimoto et al. charged to 4.2 V and discharged at 3.6 V with consideration of the discharge time limit because Barker et al. teach resultant improved capacity retention after multiple cycles.

A “whereby” clause in a method claim is not given patentable weight when it simply expresses the intended result of a process step positively recited. *Minton v. Nat 'l Ass 'n of Securities Dealers, Inc.*, 336 F.3d 1373, 1381, 67 USPQ2d 1614, 1620 (Fed. Cir. 2003). The “wherein” clause recited by Applicant is merely the intended result of the method claim, therefore it is not given patentable weight to Claim 9.

Regarding Claims 4 and 11, Fujimoto et al. teach that the element in the second layer may be one of Si, Ge, Sn Al, or In (see par. 10).

Regarding Claims 5 and 12, Fujimoto et al. teach that the element to be alloyed with lithium, Si and/or SN is/are included (see par. 10).

Regarding Claim 6, Fujimoto et al. teach that the first layer includes, among other things, graphite and diamond like carbon (see par. 13).

Regarding Claim 7, Fujimoto et al. teach that the active material of the positive electrode includes lithium cobalt oxide, lithium manganese oxide, or lithium nickel oxide (see par. 16).

Regarding Claim 8, Fujimoto et al. teach that the active material of the positive electrode includes lithium manganate (see par. 16).

7. Claims 2-3, 10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (JP 2001-283833 A) and Barker et al. (U.S. Patent No. 6,392,385 B1) as applied to Claims 1, 4-9, 11, and 12 above, and in further view of Kawamoto (JP 11-288705 A).

Fujimoto et al. and Barker et al. teach a Li ion secondary battery and method of use as recited in Paragraph 6 above.

Regarding Claims 2 and 10, Kawamoto teaches a Li ion secondary battery wherein the capacity of the negative electrode is higher than that of the positive electrode (see drawing 1). It is advantageous for the negative electrode in a Li ion secondary battery to have higher capacity than the positive electrode in order to control the irreversible capacity of the negative electrode (section 0004). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a negative electrode having higher capacity than that of the positive electrode onto the battery of Fujimoto and Barker, because Kawamoto reference teaches the resultant irreversible capacity of the negative electrode can be better regulated.

Regarding Claims 3, 13, Kawamoto teaches the addition of Li to the negative electrode to increase the Li content such that a certain amount of Li remains at full discharge (section 0007 *seq.*). It is the Examiner's position that the Li ion secondary battery of Fujimoto et al. and

Barker et al. with the teaching of Kawamoto to add Li to the negative electrode to increase the Li content such that a certain amount of Li remains at full discharge will inherently meet the condition of the Li electrically connected to the electrodes in addition to the positive electrode capacity cannot be greater than the negative electrode capacity, because the combination of Fujimoto, Barker, and Kawamoto references and the present application disclose the same materials, structure, and charging/discharging characteristics. If the prior art teaches the identical chemical structure, the properties Applicant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 709, 15 USPQ.2d 1655, 1658 (Fed. Cir. 1990). See MPEP 2112.01. A reference that is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in reference. *In re Robertson*, 49 USPQ.2d 1949 (1999). Therefore, Examiner contends that the Li ion secondary battery of Fujimoto et al. and Barker et al. inherently possesses the lithium content of the second layer between 31-67 at.% at a discharge depth of 100%, and Fujimoto et al. and Barker et al. anticipates the claimed subject matter of Applicant.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571)270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

zpb

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 4191